



PATENT APPLICATION  
Mo-6268  
LeA 34,400

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

APPLICATION OF )  
ANDREAS BULAN ET AL ) GROUP NO.: 1754  
SERIAL NUMBER: 09/891,780 ) EXAMINER: S.J. BOS  
FILED: JUNE 26, 2001 )  
TITLE: PROCESS FOR REMOVING )  
ARSENIC COMPOUNDS FROM )  
HYDROGEN FLUORIDE )

**LETTER**

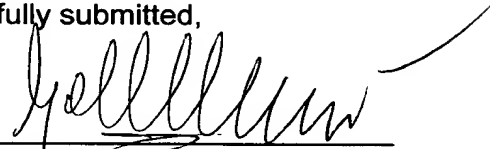
Commissioner for Patents  
Alexandria, VA 22313-1450

Sir:

Enclosed herewith are three copies of an Appeal Brief in the matter of the subject Appeal. If any additional fees are necessary, please deduct from Deposit Account Number 50-2527.

Respectfully submitted,

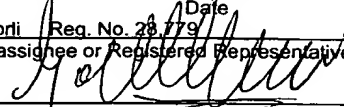
By

  
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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an enveloped addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on 12/19/03

Godfried R. Akorli Reg. No. 28,779  
Name of applicant, assignee or Registered Representative  
  
Signature  
December 19, 2003  
Date



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APPEAL BRIEF

Commissioner for Patents  
Alexandria, VA 22313-1450  
Sir:

This Brief, submitted in triplicate, is an appeal from the Final Office Action of the Examiner dated February 13, 2003.

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Godfried R. Akorli Reg. No. 28,779  
Name of Appellant, assignee or Registered Representative  
[Signature]  
Signature  
December 19, 2003  
Date

### I. REAL PARTY IN INTEREST

The real party in interest for the present appeal is the assignee Bayer AG.

### II. RELATED APPEALS AND INTERFERENCES

Appellants are unaware of other appeals or interferences that will directly affect or be directly affected by or having a bearing on the present appeal.

### III. STATUS OF CLAIMS

The above-referenced application was filed with Claims 1-4, all of which are pending but stand rejected, and are the subject of this appeal.

### IV. STATUS OF AMENDMENTS

After final rejection, and after an Examiner's interview, Appellants deeming the issues in the case to be joined, have elected to file a separate amendment after final with the Appeal, overcoming the 35 U.S.C. 112, first and second paragraphs rejections, and thus expediting the resolution of this case.

### V. SUMMARY OF THE INVENTION

It is the object of the present invention to separate off arsenic compounds capable of disposal in a landfill, in the preparation of pure hydrogen fluoride, in such a way that, the separation can be carried out in a simple manner and the amount of material to be deposited in a landfill is made as small as possible. See page 2, lines 7-11.

The object has been achieved by a process encompassing removing arsenic compounds from the distillation bottoms obtained in the distillation of arsenic-containing hydrogen fluoride, comprising:

- (a) concentrating the distillation bottoms by evaporation of hydrogen fluoride until the temperature at the bottoms is from 40 to 60°C (preferably from 40 to 50°C), and

- (b) reacting the residue with calcium hydroxide, calcium oxide, or a mixture thereof. See page 2, lines 17-24.

It has been found that the distillation bottoms obtained in the purification of hydrogen fluoride by distillation can be converted directly into a product capable of disposal in a landfill by reaction with calcium hydroxide, calcium oxide, or a mixture thereof. See page 2, lines 12-15.

## VI. ISSUES

### Issue 1

Whether in the determination of patentability under 35 U.S.C. 102(b), the Examiner erred in concluding that the referenced process step of applying a temperature range of 50°C to 150°C to a reaction mixture which is to be hydrolyzed in order to convert hexafluoroarsenic acids or salts thereof to arsenic acid or salts thereof anticipates claims directed to process of applying a temperature range of 40 to 60°C to a reaction mixture which does not require said hydrolysis.

### Issue 2

Whether in the determination of obviousness under 35 U.S.C. 103(a), the Examiner erred in ascertaining the difference between the claims and pertinent prior art, as a whole.

### Issue 3

Whether Claim 4 fails to comply with the requirements of 35 USC 112, first paragraph for lack of enablement.

### Issue 4

Whether Claims 1-4 fail to comply with the requirements of 35 USC 112, second paragraph as being indefinite.

## VII. GROUPING OF CLAIMS

Claims 1 - 4 are appealed together.

## VIII. ARGUMENTS

By the amendments to the claims and discussion to follow, Appellants have overcome the 35 U.S.C. 112, second paragraph rejections. The claims, however, presently stand rejected as being anticipated under 35 U.S.C. 102(b) and in the alternative under 35 U.S.C. 103 as being obvious over US 5,089,241, Smith.

### Summary of Appellants Arguments Overcoming the Rejection

Appellants traverse the rejection for lack of prima facie of unpatentability because the difference between the claims and prior art as a whole is neither taught nor suggested by Smith. Considered as a whole, Smith distinctly teaches a process for converting hexafluoroarsenic acid or salts thereof in an aqueous solution to arsenic acid or salts thereof, by carrying out a difficult hydrolysis of hexafluoroarsenic acid or salts thereof in the presence of certain catalysts. Temperatures of 50 to 150°C are employed in the steps of concentrating and hydrolyzing the hexafluoroarsenic acid or salts thereof.

In contrast, the claims relate to a process for removing arsenic compounds from the distillation bottoms obtained in the distillation of arsenic-containing hydrogen fluoride by concentrating the distillation bottom at a low temperature of 40 to 60°C, and then converting them into a landfill-disposable form by reacting them with calcium hydroxide, calcium oxide, or a mixture thereof, without the difficult hydrolysis of hexafluoroarsenic acid or salt thereof.

Lacking from Smith is a teaching of a process for removing arsenic compounds from the distillation bottoms obtained in the distillation of arsenic-containing hydrogen fluoride, comprising (a) concentrating the distillation bottoms by evaporation of hydrogen fluoride until the temperature at the bottoms is from 40 to 60°C (preferably from 40 to 50°C), and (b) reacting the residue with calcium hydroxide, calcium oxide, or a mixture thereof.

At best, the case of unpatentability is based on picking and choosing elements of the prior art - specifically the element of the temperature - based on retrospective analysis which is based on knowledge garnered from Appellants' disclosure.

### Details of Applicants Arguments

Claims 1, 2, and 4 stand rejected under 35 U.S.C. 102(b) as being anticipated by Smith '241 (cols. 5-8 and the Examples). Also, Claims 1-4 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Smith '241 in view of the admitted prior art, on "instant pg. 3, lines 4-7".

The rejection predicated on the grounds that:

"Smith teaches the instantly claimed process wherein bottoms are evaporated at 50-150° C and then treated with calcium hydroxide or calcium oxide (see col. 5-8)."

In point of fact, Smith teaches a process for converting hexafluoroarsenic acid or salts thereof contained in aqueous mixture to arsenic acids or salts thereof comprising the steps of:

- (a) adding acid selected from the group consisting of sulfuric acid, arsenic acid, perchloric acid and mixtures thereof to said aqueous mixture in an amount sufficient to catalyze hydrolysis of said hexafluoroarsenic acid or salt thereof, and raising the temperature of said aqueous mixture before, during or after said acid addition sufficient to remove substantially all of the hydrogen fluoride in subsequent step (b);
- (b) passing an inert gas through said heated acid mixture in quantity sufficient to remove substantially all of the hydrogen fluoride in said heated mixture, and
- (c) separating substantially all of the hydrogen fluoride from said heated acid mixture whereupon said hexafluoroarsenic acid or salt thereof converts essentially into arsenic or salts thereof. (Delineations are

Applicants' for emphasis)

Appellants discuss fully hereunder in the context of the stated issues how Smith's process of hydrolyzing hexafluoroarsenic acid or salt thereof to arsenic acid or salts thereof differs from the claims and fails to suggest the claimed invention.

### Answers to Issue 1

Appellants submit that in the determination of patentability under 35 U.S.C. 102(b), the Examiner erred in concluding that Smith's process step of applying a temperature range of 50°C to 150°C to a reaction mixture which is to be hydrolyzed in order to convert hexafluoroarsenic acids or salts therefrom to arsenic acid or salts thereof anticipates claims directed to process of applying a temperature range of 40 to 60°C to a reaction mixture which does not require hydrolysis.

While Smith teaches application of a temperature range of 50°C to 150°C, said temperature range is applied to a reaction mixture which is hydrolysable to arsenic acid or salts thereof. In contrast, Appellants' temperature range of 40 to 60°C is not applied to hydrolysable reaction mixture as described by Smith. As such, the claims differ from Smith and are, therefore, not anticipated thereby.

Cited col. 5-8, and the Examples of Smith describe hydrolysis of hexafluoroarsenic acid.

To be sure, Smith at col. 5, lines 58-60, describes heating the aqueous mixture of hexafluoroarsenic acid before, during or after the acid addition, and preferably before the acid addition. This teaching does not repose in the art the claimed process of heating hexafluoroarsenic acid at low temperatures as recited by the claims. At col. 6, line 8-20, Smith states that the aqueous mixture is subjected to evaporation at temperatures between 50°C to 150°C. In this regard, it is worth noting that it is our error to treat claims as a mere catalogue of separate parts in disregard of the part-to-part relationship set forth in the claims, *Lindermann, Maschinenfabriken GmbH v. American Hoist & Derrick Co.* 221 USPQ 481 (Fed. Cir. 1984). In this case, it would be an error to disregard the mixture or composition to which the temperature is applied. This referenced teaching differs from the claims in that the aqueous mixture is a hydrolysable mixture.

As such the claims differ from the teaching of Smith and are, therefore, not anticipated thereby.

### Answer to Issue 2

Appellants submit that the Examiner erred in ascertaining the difference between the prior art and the claims. The difference between Smith and the claims

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has been discussed above. Nothing of record provides a basis for modifying Smith to the claims, In re Fine 5 USPQ2d 1596 (Fed. Cir. 1988).

Even where the prior art discloses a range, which overlaps, but no specific examples falling within the range are disclosed, anticipation must be based on the prior art disclosure of the claimed invention with sufficient specificity. If the claims recite a narrow range and the prior art discloses a broad range and there is evidence of unexpected results within the claim-recited narrow range, it is reasonable to conclude that narrow range is not disclosed with sufficient specificity to constitute anticipation of the claims. Such is not the case here. Hence, the Examiner must provide reasons for anticipation and obviousness of the narrow range, Ex parte Lee 31 USPQ2d 1105 (Bd. Pat. App. & Inter. 1993). Appellants submit that the skilled artisan reading Smith - without the benefit of Appellants' disclosure - would not have envisaged the claimed invention therefrom

From the foregoing, the Board would agree that there is no evidence or practical reason of record which would have led the skilled artisan to make the Examiner's series of inferences leading to the claims. Namely, the skilled artisan would have to first infer modifying Smith's process by eliminating the hydrolysis step. Then the skilled artisan would have to infer that the higher temperature range for concentrating hexafluoroarsenic acid could have been modified to lower temperatures for concentrating hydrogen fluoride in distillation bottom. Further, the skilled artisan would have to infer modifying the referenced process by eliminating the step of passing inert gas through the acid mixture and separating the hydrogen fluoride, and substituting therefor the step of reacting the bottoms product (instead of arsenic acid or arsenate) with calcium products. Surely, the Board would agree that the record is devoid of bases for these series of inferences.

In view of the foregoing arguments, Appellants submit that the claims are patentable over the prior art. The claims as amended are in a condition for allowance and Appellants pray for their allowance.

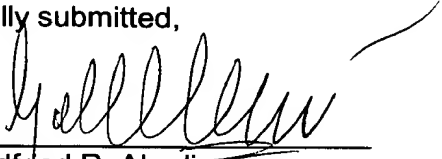
Answer to Issues 3 and 4.

The issues here are rendered moot by the amendment to the claims which is being filed herewith.

Appellants therefore submit that each of the Examiner's rejections is in error and respectfully request that the rejections be reversed and that Claims 1-4 be allowed.

Respectfully submitted,

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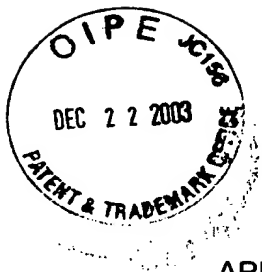
  
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## APPENDIX: CLAIMS ON APPEAL

1. A process for removing arsenic compounds from the distillation bottoms obtained in the distillation of arsenic-containing hydrogen fluoride comprising
  - (a) concentrating distillation bottoms by evaporation of hydrogen fluoride until the temperature at the bottom is from 40 to 60°C, and
  - (b) reacting the resulting residue with calcium hydroxide, calcium oxide, or a mixture thereof.
2. A process according to Claim 1 wherein the water content of the bottoms after concentration is less than 20% by weight.
3. A process according to Claim 1 wherein the arsenic-containing hydrogen fluoride contains not more than 300 ppm of water, not more than 50 ppm of sulfuric acid, and not more than 50 ppm of sulfur dioxide.
4. A process according to Claim 1 wherein the amount of calcium hydroxide, calcium oxide, or mixture thereof corresponds to the amount necessary for stoichiometric conversion of the distillation bottoms comprising products selected from the group consisting of sulfuric acid, hydrofluoric acid, and hexafluoroarsenic acid into the corresponding calcium compounds.



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Date  
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Name of Appellant, assignee or Registered Representative  
[Signature]  
Signature  
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### I. REAL PARTY IN INTEREST

The real party in interest for the present appeal is the assignee Bayer AG.

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The object has been achieved by a process encompassing removing arsenic compounds from the distillation bottoms obtained in the distillation of arsenic-containing hydrogen fluoride, comprising:

- (a) concentrating the distillation bottoms by evaporation of hydrogen fluoride until the temperature at the bottoms is from 40 to 60°C (preferably from 40 to 50°C), and

- (b) reacting the residue with calcium hydroxide, calcium oxide, or a mixture thereof. See page 2, lines 17-24.

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In contrast, the claims relate to a process for removing arsenic compounds from the distillation bottoms obtained in the distillation of arsenic-containing hydrogen fluoride by concentrating the distillation bottom at a low temperature of 40 to 60°C, and then converting them into a landfill-disposable form by reacting them with calcium hydroxide, calcium oxide, or a mixture thereof, without the difficult hydrolysis of hexafluoroarsenic acid or salt thereof.

Lacking from Smith is a teaching of a process for removing arsenic compounds from the distillation bottoms obtained in the distillation of arsenic-containing hydrogen fluoride, comprising (a) concentrating the distillation bottoms by evaporation of hydrogen fluoride until the temperature at the bottoms is from 40 to 60°C (preferably from 40 to 50°C), and (b) reacting the residue with calcium hydroxide, calcium oxide, or a mixture thereof.

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"Smith teaches the instantly claimed process wherein bottoms are evaporated at 50-150° C and then treated with calcium hydroxide or calcium oxide (see col. 5-8)."

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- (b) passing an inert gas through said heated acid mixture in quantity sufficient to remove substantially all of the hydrogen fluoride in said heated mixture, and
- (c) separating substantially all of the hydrogen fluoride from said heated acid mixture whereupon said hexafluoroarsenic acid or salt thereof converts essentially into arsenic or salts thereof. (Delineations are

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Appellants discuss fully hereunder in the context of the stated issues how Smith's process of hydrolyzing hexafluoroarsenic acid or salt thereof to arsenic acid or salts thereof differs from the claims and fails to suggest the claimed invention.

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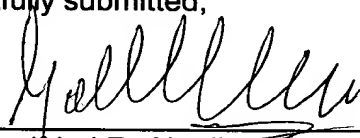
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Respectfully submitted,

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s:/sr/akorli/gra0570

## APPENDIX: CLAIMS ON APPEAL

1. A process for removing arsenic compounds from the distillation bottoms obtained in the distillation of arsenic-containing hydrogen fluoride comprising
  - (a) concentrating distillation bottoms by evaporation of hydrogen fluoride until the temperature at the bottom is from 40 to 60°C, and
  - (b) reacting the resulting residue with calcium hydroxide, calcium oxide, or a mixture thereof.
2. A process according to Claim 1 wherein the water content of the bottoms after concentration is less than 20% by weight.
3. A process according to Claim 1 wherein the arsenic-containing hydrogen fluoride contains not more than 300 ppm of water, not more than 50 ppm of sulfuric acid, and not more than 50 ppm of sulfur dioxide.
4. A process according to Claim 1 wherein the amount of calcium hydroxide, calcium oxide, or mixture thereof corresponds to the amount necessary for stoichiometric conversion of the distillation bottoms comprising products selected from the group consisting of sulfuric acid, hydrofluoric acid, and hexafluoroarsenic acid into the corresponding calcium compounds.